

## TRAUMATIC RUPTURE OF THE KIDNEY\*

By GEORGE F. SCHENCK, M. D.  
Los Angeles

DISCUSSION by Charles Pierre Mathé, M. D., San Francisco; Edward W. Beach, M. D., Sacramento; Clark M. Johnson, M. D., San Francisco.

THIS paper is based on the review of forty-two cases of traumatic rupture of the kidney that have been treated on the urological service of the Los Angeles County General Hospital since 1929. These clinical records include all cases of hematuria of traumatic origin that possessed two or more of the so-called classical symptoms (hematuria, pain, muscular rigidity, tumor, and ecchymosis), referable to the kidney area. There were fourteen cases in which a presumptive diagnosis was made from the symptoms, and twenty-eight cases in which a positive diagnosis was made either by cystoscopy, ureteral catheterization, retrograde pyelography, intravenous urography, or autopsy findings.

It is not the purpose of this paper to discuss the literature, which is far too voluminous to be adequately covered in such a communication, nor to dwell on individual case histories, nor to boast of or excuse mortality statistics which, as a matter of fact, conform closely to many others which have been published, with reference to etiology, theories of cause for rupture of the kidney, symptoms, complications, pathology, and end-results.

There are, however, several salient factors of clinical importance with reference to symptoms, diagnosis, treatment, complications, and results that I wish to emphasize appropriately as I analyze these aforementioned topics, since they are a necessary part of the clinical picture presented by these types of cases.

## ETIOLOGY

The oldest patient was 64 and the youngest three years. The average was 25.6 years. There were thirty-eight males and four females. Twenty cases involved the right side, and twenty-two the left side.

*Nature of the Injuries.*—The injury to the kidney was often variable and disproportionate to violence:

## 1. Direct force.

Sudden severe external trauma to the loin, over the kidney, and falls, striking upon the back or abdomen; crushing force, as when run down by, or in overturned, automobiles (twenty-eight cases).

## 2. Indirect force.

Falls of the body landing upon the head, feet, buttocks, that is, without direct trauma over the kidney area (three cases):

(a) A child, aged 8, fell while playing and fractured a rib and suffered a contusion of the kidney.

(b) A man fell six feet, struck on his buttocks. A urologic study disclosed a rupture of the lower pole of the kidney.

(c) A woman, while intoxicated, jumped out of a second-story window and fractured the rami of the pelvis. The injury to the kidney was a contusion.

## 3. Kicks or blows over the kidney.

(a) Three cases attributed their injuries of the kidney to kicks over the loin while playing football.

(b) Blows over the kidney (two cases): one was struck over the kidney while boxing, and the other was struck in the loin by the elbow of a team mate while playing football.

## 4. Penetrating or puncture wounds.

There were three gunshot and two stab wounds.

## 5. Sudden muscular contraction.

A school boy, aged 13, jumped over the fence and ruptured the upper pole of a hydronephrotic kidney.

## PATHOLOGY

In this series of cases all of the discernible tears were transverse to the long axis of the kidney. There were, apparently, thirteen intracapsular contusions or tears, nineteen transcapsular, five multiple (pulpification), four tears extending into the vascular pedicle, and two patients that had coexisting renal disease. The extent of

TABLE 1.—Outlining Nature of the Injuries

1. Location of the injuries:	
Intracapsular injuries.....	13
Transcapsular injuries.....	19
Co-existing renal disease .....	2
Location not stated .....	8
2. Location of the single tears:	
Lower pole .....	10
Upper pole .....	3
Middle portion .....	4
3. Location of the multiple tears:	
(Pulpification) .....	5
4. Tears involving pelvis .....	6
Tears involving ureter .....	0
Tears involving pedicle .....	4
Tears involving peritoneum .....	1

the injury did not depend upon the trauma producing it, nor upon the manner in which it was applied. The ruptures extended to varied depths into the kidney tissue, sometimes on the anterior and again only on the posterior surface. The edges of the rupture were frequently stellate, and it was usual to find one extremity, an upper or lower pole, ruptured or torn free from the kidney; or the kidney may be bisected, trisected, or pulpified. The tears showed a tendency to follow the embryologic lines of development of the kidney.

## SYMPTOMS

The symptoms of traumatic rupture of the kidney are shock, pain in the region of the kidney, tenderness over the costovertebral angle, muscular rigidity, hematuria, and abnormal mass in the loin, and ecchymosis. The symptoms were significant, but variable and inconstant.

1. Shock was present in eighteen, and absent in twenty-four cases; when present it was mild, severe, transitory, or delayed.

2. Pain was present in thirty-seven cases. It was limited to the loin on the injured side (twelve

\*From the Urological Service, Los Angeles County General Hospital.

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cases); limited to the loin and abdomen on the injured side (twenty-five cases); and to the loin, abdomen, and chest (five cases). It usually subsided after a few days.

3. Tenderness in the costovertebral angle was present in all patients who complained of pain.

4. Muscular rigidity was present in the loin of the injured side in every case, and over the corresponding side of the abdomen (twenty cases); and it was general over the abdomen (ten cases). Often it was more marked in the upper quadrant of the injured side (twelve cases), or in the lower quadrant (eight cases).

5. Hematuria was present in thirty-nine cases, undetermined in one moribund case, and absent in two cases. It was delayed in three, intermittent in eight, transitory in seven, and found by microscopic examination in two cases. Three cases had retention of urine, and catheterizations revealed bloody urines which contained clots.

6. An abnormal retroperitoneal mass of variable size was present in nineteen, absent in seventeen cases, and undetermined in six.

7. Severe bruises, discoloration and ecchymosis (showing evidence of external violence), in the loin over the kidney injury, were present in seventeen, absent in nineteen, and not recorded in six cases.

There was no apparent relationship between the severity of the symptoms (aside from the shock and evidence of the loss of large quantities of blood) and the amount of injury to the kidney. Although constant, frequent coexisting injuries obviated pain and muscular rigidity as characteristic symptoms. All other symptoms, including hematuria, were variable, inconstant, or confusing, and did not justify more than a presumptive diagnosis. Obviously, a urologic study is required to make a positive diagnosis of traumatic rupture of the kidney.

#### DIAGNOSIS

An immediate and as definite a diagnosis as it is possible should be made concerning the injury to the kidney, and whether there exists complicating injuries; and as much information as is possible should be obtained regarding the uninjured kidney.

In this series the most effective diagnostic procedures were, viz.:

1. A kidney, ureter, and bladder x-ray picture was done in thirty-six cases. It gave only suggestive evidence of a kidney injury in five cases, but added much valuable information in regard to fractures and coexisting renal disease.

2. Observation cystoscopy was done in twenty cases, and furnished diagnostic information in all but two cases in which hematuria was absent.

3. Catheterization of the ureters was done in fourteen cases (eleven times on the injured side, and four times on the opposite side) to rule out renal pathology, and eight times on both sides for urologic study.

4. Retrograde pyelograms were done ten times, and showed definite silhouette of the opaque media into the perirenal tissues in six cases.

5. Intravenous pyelography was attempted in fifteen cases. It furnished diagnostic information, viz.:

(a) Satisfactory pyelograms for diagnostic purposes were obtained in two cases (13 per cent).

(b) Valuable information regarding the uninjured kidney was obtained in eleven cases (73 per cent).

(c) In nine cases there was a negative shadow on the injured, and a positive shadow on the uninjured side (60.3 per cent). The examination was repeated in several cases, and the negative shadow on the side of the injury was found to be persistent until the kidney was well on its way to recovery.

(d) In four cases, in severe shock, there were bilateral, indefinite negative shadows (26.6 per cent). In two of these cases, after shock had been obviated by blood transfusions and supportive treatment, intravenous urography revealed positive shadows on the uninjured, and negative shadows on the injured side.

(6) Indigo-carmin was used, intravenously, in nine cases. The appearance and concentration was normal from the uninjured side in all cases, but it showed variable delayed appearance and concentration on the injured side in seven cases.

In no instance did ureteral catheterization have a detrimental effect (aggravation of hemorrhage, or infection), as is stated in several textbooks. On the contrary, ureteral catheterization and pyelographic study aided to rule out two pathologic kidneys that had given a history of injury and complained of hematuria. An inlying catheter on the injured side (changed four times) enabled Doctor Day to treat expectantly and successfully a rupture of the lower pole of the kidney that showed definite extravasation of the opaque media, and had an abnormal mass in the loin of the injured side; complicated by a fracture of the seventh cervical vertebra, and a fracture of the femur. Incidentally, the same surgeon catheterized and treated with an inlying ureteral catheter, on the injured side, an apparent pyelonephritis (five times) in a male child three years old. Later this child developed a perinephritic abscess that was drained. The postoperative convalescence was uneventful. Subsequent follow-up notes indicated that there was no further trouble in the urinary tract.

Intravenous urography is to be recommended as the most applicable and safest diagnostic procedure available for the study of kidney injury. It is informative when properly interpreted, and when used under favorable circumstances. A frequent negative shadow on the side of the injury is diagnostic evidence, but does not furnish pathologic information. Although infrequent, a positive shadow furnishes adequate diagnostic information.

It is apparent that:

1. The injury to the kidney causes a partial or complete temporary anuria.

2. After kidney injury, edema impairs function sufficiently to lower the concentration below the amount necessary for a skiagraph.

3. The bilateral negative shadows, in the cases of severe shock, are due to lowered volume of blood in the kidney on account of the fall in blood pressure.

#### COMPLICATIONS

Serious complications were present in twenty-eight, and absent in fourteen cases. Their prevalence and wide distribution stresses the importance of complete examinations that include adequate differential roentgen-ray pictures for their detection. Immediate and appropriate treatment of the complicating injuries, in accordance with the principles and practice of surgery, are a necessity, for in many instances they are far more serious and add shock, infection, and mortality. (Two-thirds of the mortality in this series of cases was a result of the complicating injuries, and not the traumatic rupture of the kidney.) It should be remembered that complicating injuries of the brain, abdominal viscera, and chest may be latent in manifesting themselves.

The most frequent complications were fractures (twenty—multiple, sixteen; single, four). They were as indicated in Tables 2 and 3.

#### TREATMENT

The treatment of each patient presents an individual problem that necessitates judgment and experience. A careful analysis of the patient's general condition is a prerequisite whether the treatment selected is expectant or surgical. Severe shock or hemorrhage are manifested by a rapid, feeble pulse, low blood pressure, low red cell count, and low hemoglobin. In this series of cases a persistent low systolic blood pressure (less than 100), a red cell count under 4,000,000, or a hemoglobin under 60, called for an immediate blood transfusion and supportive treatment with intravenous and subcutaneous fluids. Eight cases had one blood transfusion and two cases had two transfusions; in all favorable cases this obviated shock and improved the patient's general condition noticeably. Three of the surgical patients died from complicating injuries.

The white cell count was exceedingly high (lowest 8,400, highest 26,000, average 17,600), and accompanied by a corresponding high polymorphonuclear count, average 87.2 per cent. Two other fatal cases had white cell counts of 2,760 and 3,600, with no increase in the polymorphonuclear count, which should not be mistaken for signs of intra-abdominal bleeding or infection.

TABLE 2.—*Kinds of Complicating Injuries*

<b>A. Fractures:</b>	
Skull (basal) .....	1
Bones of face .....	1
Seventh cervical vertebra .....	1
Dorsal vertebra .....	1
Transverse processes of lumbar .....	3
Sacrum .....	1
Ribs .....	10
Bony pelvis .....	3
Arm .....	4
Leg .....	3
Femur .....	1
<b>B. Dislocations:</b>	
Hip .....	1
<b>C. Injury to viscera:</b>	
Various visceral injuries .....	16

TABLE 3.—*Other Complicating Injuries*

Rupture of esophagus .....	1
Rupture of duodenum .....	1
Rupture of liver .....	3
Gunshot wounds .....	2
Rupture .....	1
Gunshot wounds of stomach .....	1
Gunshot wound of pancreas .....	1
Peritoneal tears—G. S. W. ....	1
Subdiaphragmatic pleurisy .....	1
(Traumatic origin)	
Hemothorax .....	2
Pneumothorax .....	3
Vascular .....	1
Rupture of the lung .....	1

#### EXPECTANT TREATMENT

Expectant treatment with repeated blood pressure readings and hemoglobin determinations, every one or two hours, are the safest guides to the progress of the case, and the most definite indications for surgical intervention.

Thirty-one patients were treated expectantly. The convalescence was uneventful in twenty-three, septic in six, and two died from shock and hemorrhage, one as the result of a ruptured duodenum and mesenteric artery, and the other from rupture of the lung, bisection of the kidney, and fracture of all of the right ribs. The cases that had a septic temperature were treated expectantly, because complicating injuries made it necessary to modify the treatment.

Recurrent hemorrhage or infection were the indications for abandoning the expectant for surgical treatment in four cases; and each case had an uneventful postoperative convalescence. The average hospital stay was twenty and eight-tenths days for the expectant cases. The mortality was 3.3 per cent.

#### CONSERVATIVE SURGERY

Surgical intervention is indicated whenever there is evidence of primary or secondary uncontrollable hemorrhage, sepsis, or urinary extravasation into the retroperitoneal tissues. The surgery should be as conservative as is consistent with the exigencies of the case; and it should not be done too soon nor too late.

Conservative surgery was done on six cases:

1. One case had evacuation of clots, and a tear in the lower pole of the kidney was closed with mattress sutures. The convalescence was uneventful and the patient left the hospital in sixteen days.

2. One patient, admitted eleven and one-half hours after an automobile accident, was comatose, the blood pressure was 98/72, temperature 100, pulse 160, respiration 32, the red cell count 3,240,000, and hemoglobin 56. After a blood transfusion the temperature was 100, pulse 120, respiration 22, and the blood pressure 118/74. Surgery was indicated for severe and uncontrollable hemorrhage. At operation a huge hematoma extending from the diaphragm to the pelvis was evacuated. The lower pole of the kidney was found to be completely severed and there was active arterial bleeding from the region of the pelvis. The bleeding was arrested by ligation, and the lower pole was approximated to the kidney

with mattress sutures. The patient died on the operating table.

3. One patient who was treated expectantly for thirty days developed an abscess in the lower pole of the kidney that was excised, and the cut edges approximated with mattress sutures. The convalescence was uneventful and the patient left the hospital in forty days.

4. One child, aged three, was treated expectantly for kidney injury. He developed a perinephritic abscess that necessitated drainage, and a rent in the lower pole of the kidney was verified at operation. The symptoms were masked in this case by the development of an acute pyelonephritis in the injured kidney that required five ureteral catheterizations for treatment, and the chickenpox which obviated adequate treatment while the child was isolated. He recovered after ninety days' hospitalization. The follow-up notes disclose no urinary trouble, nor discomfort in the area of the injured kidney or bacteriuria.

5. One case with rupture of the lower pole of the kidney had an exploratory laparotomy in general surgery. His complaint on admission contained three of the classical symptoms of traumatic rupture of the kidney, in addition to gross hematuria, that was persistent and continuous for thirty days. In this period the patient had two urologic consultations, but no cystoscopy or urography. After sixty days the patient became septic, a retrograde pyelogram revealed diffuse extravasation of the media into an infected hematoma in the region of the lower pole of the kidney. At operation, in addition to an infected hematoma, an area of necrosis around a tear in the lower pole of the kidney was excised. A nephrotomy tube was placed in the kidney pelvis and the hemorrhage controlled with mattress sutures. The postoperative convalescence was uneventful, and the patient left the hospital in twenty-two days.

6. Treated expectantly for three days, but the tumor in the loin increased in size and the patient developed a septic temperature. Operation: Incision, evacuation of clots, drainage for extravasation of urine and packs to tear in the lower pole of kidney for control of hemorrhage. Convalescence uneventful and the patient left the hospital after sixteen days.

#### RADICAL SURGERY

Nephrectomy was done on five cases:

1. Rupture of the upper pole of the kidney with congenital hydronephrosis in a child, aged thirteen, had evidence of severe and uncontrollable bleeding; sepsis, and large abnormal mass in the loin. Transfusion. Nephrectomy. Convalescence uneventful.

2. Stab wound, involving the upper pole of the kidney. Explored in private hospital four days previous to admission. Had three severe recurrent hemorrhages. Nephrectomy for severe and uncontrollable hemorrhage. There was marked necrosis in the wound in the kidney that involved most of the upper pole. Convalescence uneventful, and the patient left the hospital in thirty-two days.

3. The patient was treated expectantly for sixty days because of complicating injuries, but developed severe and recurrent hemorrhage and septic temperature. At operation an infected hematoma, urinary extravasation, and marked necrosis involving the lower pole of the kidney necessitated a nephrectomy.

4. A case of pulpification of the kidney required a nephrectomy for uncontrollable hemorrhage. The patient developed a septic postoperative temperature, suppurative cervical adenitis, and a peritonsillar abscess, and died after twenty-two days. At autopsy a rupture of the esophagus and a mediastinal abscess was discovered to be the cause of death. The nephrectomy wound had healed.

5. Admitted from an outside hospital with history of multiple fractures, exploratory laparotomy, incision and drainage of loin for evacuation of a hematoma and urinary extravasation. Had a urinary sinus that closed after three months, but developed pain in the right loin and right upper quadrant after two months, and a hematuria for the past three days. Urologic study revealed an occlusion of the ureter, on the injured side, 25 centimeters from the orifice. The opposite kidney was normal. At operation a marked fibrosis of the perirenal tissues made it impossible to dissect out the pedicle. An extracapsular nephrectomy was done by placing the clamps across the pelvis and ligating with a suture ligature after the technique of MacGowan and Parker. The ureter was apparently intact, but had been occluded by fibrosis and perinephritis.

#### RESULTS

There was a total of ten deaths in this series of forty-two cases (23.8 per cent). In but four cases should the cause of death be attributed to traumatic rupture of the kidney (9.5 per cent).

##### *A. Cause of Death—Rupture of the Kidney.*

1. A case of pulpification of the kidney was moribund on admission, because of exsanguination, and the patient died before he could be treated.

2. One patient was treated expectantly on account of suspected complications; died from shock and hemorrhage, which the autopsy revealed to be due to rupture of the kidney.

3. One patient, comatose, exsanguinated and in extreme shock, was found to have a complete severance of the lower pole of the kidney at operation. Died on the operating table.

4. The patient was exsanguinated and in severe shock on admission. He did not respond to a blood transfusion and active supportive treatment. He died in seven and one-half hours from shock and hemorrhage. The autopsy findings were a fracture of all of the right ribs, rupture of the lung, hemothorax (500 cubic centimeters), a large retroperitoneal hematoma, bisection of the kidney, and a tear involving the vascular pedicle.

##### *B. Cause of Death—Complicating Injuries.*

1. Rupture of the kidney was treated expectantly. The cause of death, as reported by the coroner, was due to shock and hemorrhage follow-

ing rupture of the duodenum, mesenteric artery, and fracture of the rami of the pelvis.

2. Pulpification of the kidney; patient died twenty-three days after nephrectomy. Cause of death: rupture of the esophagus and mediastinal abscess.

3. Rupture of the liver and pulpification of the kidney. Patient dying when admitted.

4. Pulpification of the kidney and basal skull fracture. Dying when admitted.

5. One case diagnosed as rupture of the lower pole of the kidney and suspected internal injuries. Not treated. Transferred to a private hospital, and died of peritonitis.

6. Gunshot wound of the stomach, pancreas, pulpification of the upper pole of the kidney. Laparotomy was done for repair of intra-abdominal injuries. The kidney condition was treated expectantly. The patient died of peritonitis.

1930 Wilshire Boulevard.

#### DISCUSSION

CHARLES PIERRE MATHÉ, M. D. (450 Sutter Street, San Francisco).—We are indebted to Doctor Schenck for his timely contribution on traumatic rupture of the kidney, in which he emphasizes salient points that enhance its diagnosis and its successful treatment. He points out that difficulty of diagnosis is often due to obscurity of symptoms. Hematuria has been considered as pathognomonic of rupture of the kidney; yet this cardinal sign is variable and is likely to be absent, particularly if the tear does not involve the kidney pelvis, collecting tubules or calices. Rupture of the parenchyma usually results in extravasation of blood into the renal loge, which is either confined within the limits of the perirenal fascia, giving rise to more or less grave symptoms, or finds its way into the renal pelvis or peritoneal cavity, resulting in rapid death by exsanguination. Rupture of the pelvis, one of the major calices or ureter, is followed by extravasation of urine into the renal fossa; this invariably results in the formation of an abscess which may be limited within the confines of the renal fossa, or may perforate into the peritoneal cavity or lung, causing grave symptoms and sometimes death. In many cases an accurate diagnosis can only be made by a complete urologic study, consisting of ureteral catheterization, urography, including retrograde and intravenous pyelography, or functional kidney studies, etc. I am glad to see that the essayist does not hesitate to investigate the case of the patient in whom the diagnosis of ruptured kidney is doubtful, and states that which all progressive urologists should assume, namely, that ureteral catheterization does not aggravate hemorrhage nor favor infection. In some instances, the ureteral catheter permits one to drain the pelvis and relieve hematuria due to minor ruptures of the pelvis or parenchyma.

I wish to point out the fact that a kidney which has been weakened by stone formation, hydronephrosis, chronic nephritis, pyelonephritis, tuberculosis, abscess formation, tumor, infarct or aneurism, is more readily ruptured than the healthy organ. The slightest blow may cause rupture of the weakened diseased organ. These sometimes rupture spontaneously, and recently I reported six such cases.

There is no question that a goodly number of ruptured kidneys heal without causing subsequent trouble or resulting in permanent damage to this organ. In others, extravasation of urine and blood in the perirenal tissues is followed by resolution, resulting in perinephritis with fibrosis of the perirenal fat, which may involve and compress the ureter, and so cause obstruction and hydronephrosis. In others, rupture of a calyx may result in cystic dilatation of the kidney, the calyx becoming walled off and losing its communication with the renal pelvis—a condition which is

known as pseudohydronephrosis. Still more rarely, renal contusion results in the formation of aneurism of the renal artery or stone, the calculus being formed around a nucleus made up of a retained blood-clot.

The treatment outlined by Doctor Schenck is rational, and calls for keen judgment and experience. The choice between expectant treatment, conservative surgical measures and nephrectomy should be based on the findings of each individual case. In the late case of extensive injury complicated by infection, it might be well to do a two-stage operation, consisting of primary incision, and arrest of hemorrhage and drainage; and when the patient's strength has been restored, to follow this by a secondary nephrectomy.

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EDWARD W. BEACH, M. D. (Medico-Dental Building, Sacramento).—In my opinion, the most exacting modern Aristarchus, after the example of his illustrious predecessor, must employ numerous asterisks and very few obelisks in adjudging Doctor Schenck's instructive essay.

This article is concise, yet comprehensive, in its review of these forty-two cases of kidney injuries, occurring at the Los Angeles General Hospital since 1929. Certain aphorisms may be adduced after careful consideration of this paper. First, those concerning the occurrence of kidney injury; second, those concerning diagnosis; and third, those concerning its treatment.

Kidney injury is much commoner than is usually supposed in these days of high-speed life and transportation. It varies in extent and degree, not always proportionate to the exciting factor nor to the force applied. Apparently it respects no age limits, but is seen more often in the male during his prime years. And preëxisting kidney pathology courts injury.

Accurate diagnosis is always a prerequisite to satisfactory management, but is always secondary to the general condition of the patient. Doctor Schenck rightly directs attention to the shortcomings of intravenous urography when employed in these traumatic kidney injuries, the very group most tempting for skioidan. Absence of any shadow, disappointments, and erroneous conclusions are all too frequent a reward for one's efforts in this field. Since the average urologist possesses neither the perception of Zadig nor the ivory tube of Prince Ali, I feel that, whenever possible, a retrograde pyelogram in this type of case is obligatory. By this means alone is one sure to obtain a definite and concrete portrait of the location, extent and position of the injury. In skilled hands, with the use of the manometer, the danger is slight, and the knowledge gleaned therefrom more than compensates for the risk. Extravasated pyelographic media are seldom provocative of difficulties and are quickly absorbed. Only this method affords positive and scientific evidence, and it therefore takes precedence over any and all presumptive signs.

Treatment must always take cognizance of shock and concomitant injuries. Rarely does hematuria cause death, unless the pedicle is torn or the kidney pulpified; and then shock often closes the picture before the surgery is reached. With accurate knowledge of the injury, expectant conservatism is usually the best policy. If the bleeding persists, if the mass in the loin increases, if urinary extravasation is suspected because of a tear through a salyx, or if there is an obstruction below in the ureter, then surgical intervention is justifiable and necessary.

Through the efforts of urologists, the attention of the general surgeon has been directed toward kidney possibilities in all accident cases; and today the surgeon is alert and watchful for this pathologic entity. Moreover, because of the urologist's studies, he knows how to cope with this accident when it is encountered.

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CLARK M. JOHNSON, M. D. (384 Post Street, San Francisco).—Doctor Schenck has presented an unusually large and carefully studied group of patients with rupture of the kidney.

It is apparent that there are two general groups of cases: (1) Those complicated by other injuries. (2) Those with only renal injury. In the first group of complicated injuries, there are two main types—(a) bone, and (b) visceral injuries.

The bone injuries are usually evident and offer no great difficulty in differential diagnosis. The second group with complicating visceral injuries taxes the combined judgment and skill of the emergency surgeon and the urologist. I refer particularly to injury of the liver and spleen. In a much smaller series of cases at the San Francisco General Hospital, of ten cases of renal rupture with complicating injuries there were three ruptured spleens and one ruptured liver, with rupture of the left and right kidney, respectively. In this group, also, should be included cases of intraperitoneal rupture which are rare and equally rarely successfully diagnosed. The speaker has pointed out the methods and difficulties of diagnosis. The conclusions for this group of cases are only these: In cases of injury with abdominal signs and symptoms plus shock and hemorrhage, abdominal exploration and exploration of the renal fossae are mandatory. Prompt surgery and multiple transfusions are our only hope in such cases.

In the second group, where the kidney only is involved, there is one important question: whether to intervene surgically or to treat the patient expectantly. Only from such large series of cases and personal experience can we answer the question in general, for each case presents its individual problem. I should like to know Doctor Schenck's reaction to the hypothesis that more radical surgery or, perhaps more aptly, earlier surgery, may result in greater conservation of renal tissue with no increase in loss of life. To be more specific, too long delayed surgery in evident rupture may result in irreparable infection and necessitate nephrectomy, while comparatively early surgery, after the period of shock is past, should decrease our mortality and our nephrectomies.

## VENEREAL DISEASES IN SAN FRANCISCO\*

### A SURVEY

BY TALIAFERRO CLARK, M. D.

AND

LIDA J. USILTON†

Washington, D. C.

DISCUSSION by J. C. Geiger, M. D., San Francisco; Robert V. Day, M. D., Los Angeles; H. J. Templeton, M. D., Oakland.

### INTRODUCTION

A ONE-DAY census of cases of venereal disease, under observation or treatment by any authorized source in San Francisco, was made at the invitation of the city and state health authorities by the United States Public Health Service in coöperation with the American Social Hygiene Association. It is an integral part of a complete survey of the medical aspects of social hygiene in San Francisco. This city was selected as representative of conditions in the Pacific Coast region, in a series of prevalence surveys which have been made in various localities throughout the United States, including not only large metropolitan cities,

such as New York City, Cleveland, Detroit, Baltimore, and New Orleans, but also extending from hamlets to entire states. In fact, the prevalence surveys to date include the sources of treatment charged with the maintenance of the health of 20 per cent of the population of the United States.

### PURPOSE

The experience gained throughout the communities in which these one-day census surveys have been conducted has emphasized the soundness of making this particular type of survey the primary step in the planning of an effective campaign for the control of venereal diseases. Until the inauguration of the one-day census in the field of venereal diseases, most indices of the infected population showed so wide a range as to render them unreliable. However, there has been such a marked similarity in the rates established through these surveys that, if given the treatment facilities—the social and economic status of a community, with the general census data of age, sex and race distribution—it is possible to foretell with a fair degree of accuracy the probable prevalence rate for venereal diseases in a particular community. Using this rate of the spread of the venereal diseases in the general population as a base, the effects and duration of these diseases could be converted into more definite statements, and would form the base line from which to determine the trend of the venereal diseases in the future.

While the results of the present survey are entirely comparable with those of the surveys previously made, San Francisco does have one feature which is not common to any of the other communities, and that is the size of its Chinese, Japanese, and Mexican population. Here is found the largest Chinese center in the United States, with a death rate that is almost three times as high as that among all the other races. An effort will be made to analyze the extent to which syphilis plays a part in this high death rate.

### METHODS OF SURVEY AND DEFINITIONS OF TERMS USED

A one-day census of venereal disease is made by reaching all treatment sources authorized to care for the sick, and requesting data as to the number of persons under treatment or observation for a venereal disease on any one day; the date of the present survey having been August 1, 1931. These data are indicated by sex and race of the patient, and by the stage of the disease at which the patient reported for treatment. The rate based on these data is known as the prevalence rate per 1,000 population for the given community. In addition to these data, information was sought as to the number of cases reporting for treatment of the present infection to any source for the first time. The rate thus established is known throughout this report as the incidence of the disease, *i. e.*, the number of first-time admissions for the treatment of the present infection.

In the interest of uniformity of reporting, and realizing that in some instances exact information

\* A report on the survey of venereal diseases in San Francisco made by the United States Bureau of Public Health Service in coöperation with the Health Department of the City and County of San Francisco and with the approval of the California State Board of Health and the American Social Hygiene Association. Report made by Taliaferro Clark, Assistant Surgeon General, and Lida J. Usilton, Associate Statistician, U. S. Public Health Service.

† The entire field work involved in securing a one hundred per cent return of questionnaires in San Francisco was done by Samuel M. Auerbach of the American Social Hygiene Association.